

Advanced Gas Turbine Cycles J. H. Horlock, Elsevier Science Ltd, Kidlington, Oxford, 2003.

REVIEWED BY WILLIAM W. BATHIE¹

This book requires that the individual using the book be very familiar with the principles of thermodynamics. Most of the equations presented in the text are presented in final form with very little development. Abbreviations (such as CBTBTX, CICBTBTX, etc.) are used extensively in the text, requiring the reader to quickly develop an understanding of the meaning of the letters used in the abbreviations or constantly refer back to the text.

The book has many strengths. The author contrasts the thermal efficiency of a closed gas turbine cycle with the efficiency for an open cycle. It covers a wide range of configurations for gas turbine cycles from the basic cycle, improvements to the basic cycle, combined steam and gas turbine cycles, combined heat and power cycles, and novel cycles illustrating ways to control and/or remove CO₂ emissions. The author gives reasons why modifications help achieve higher cycle efficiencies, including figures (plots) that show trends as one or more variables are changed, but does

not include numerical calculations to justify these trends. The text includes a good discussion on why turbine cooling is used and another on the change in stagnation temperature and pressure through an open cooled blade row. Excellent references are included for those who want additional details and/or detailed numerical calculations on the many cycles discussed in this text. A brief discussion on how electricity is priced is included in the appendix.

The text has several weaknesses. Many of the equations are not developed in the book, but are given only in final form. This requires that the reader be very familiar with the source and limitations of the equations. Figures extensively use abbreviations. One must either be very familiar with what these symbols represent or constantly refer back to the text material that identifies them. The text lacks numerical calculations. The reader must refer to listed references for more details or rely exclusively on the figures included with the book to observe trends that occur as one or more variables are changed.

Individuals wanting an overview of the various cycles will find this book useful. Practicing engineers that want an in-depth analysis of these cycles will find other combined cycle, gas turbine cycle, or power plant engineering books more useful.

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